Automated Design and Analysis Tool for CEV Structural and TPS Components, Phase I

Completed Technology Project (2006 - 2006)

Project Introduction

The innovation of the proposed effort is a unique automated process for the analysis, design, and sizing of CEV structures and TPS. This developed process will permit hundreds of conceptual and preliminary design trade studies to be performed in a matter of only a few days rather than several months. This shorter time is made possible by replacing or reducing currently required experienced analyst interaction (man in the loop) with predefined knowledge based sizing templates and floating virtual structural component definitions for both surfaces zones and connecting bonded/bolted joints. The resulting capability will be an open architecture built within the HyperSizer

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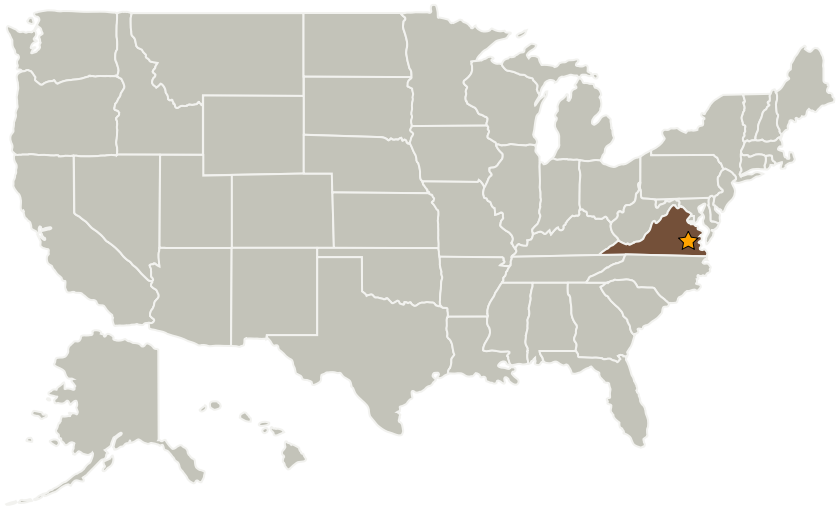
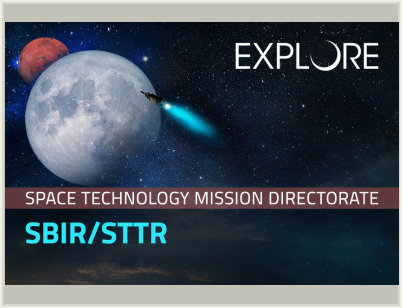
commercial software suitable for internally integrating NASA or industry developed specialty discipline analysis codes and externally integrating HyperSizer with NASA larger design systems. This new capability will be unique in that no other commercial or non-commercial tool will have the same level of depth, breadth, accuracy, speed, verification & validation, and software robustness for performing weight prediction and reduction, structural integrity margins-of-safety reporting, and reliability prediction and improvement. This innovation will involve four tasks: 1) Development of knowledge based sizing templates; 2) Development of floating virtual components; 3) Support for NASA on-going multi-disciplinary design system integration activities; and 4) Development of an automated HyperSizer-FEM iteration process for achieving FEA load convergence.

Primary U.S. Work Locations and Key Partners





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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Langley Research Center (LaRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Langley Research Center(LaRC)	Lead Organization	NASA Center	Hampton, Virginia
Collier Research & Development Corporation	Supporting Organization	Industry	Hampton, Virginia

Primary U.S. Work Locations
Virginia

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX15 Flight Vehicle Systems
  - TX15.1 Aerosciences
    - TX15.1.3 Aeroelasticity